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Stationary training equipment —

Part 7: Rowing machines, additional specific safety requirements and test method

Équipement d'entraînement fixe —

Partie 7: Rameurs — Exigences spécifiques de sécurité et méthodes d'essai supplémentaires

Reference number
ISO 20957-7:2005(E)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 20957-7 was prepared by CEN (as EN 957-7) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 83, *Sports and recreational equipment*, in parallel with its approval by the ISO member bodies.

ISO 20957 consists of the following parts, under the general title *Stationary training equipment*:

— *Part 1: General safety requirements and test methods*

— *Part 2: Strength training equipment, additional specific safety requirements and test methods*

— *Part 4: Strength training benches, additional specific safety requirements and test methods*

— *Part 5: Pedal crank training equipment, additional specific safety requirements and test methods*

— *Part 6: Treadmills, additional specific safety requirements and test methods*

— *Part 7: Rowing machines, additional specific safety requirements and test methods*

— *Part 8: Steppers, stairclimbers and climbers — Additional specific safety requirements and test methods*

— *Part 9: Elliptical trainers, additional specific safety requirements and test methods*

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational equipment”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

This standard EN 957 “Stationary training equipment” consists of the following parts:

Part 1: General safety requirements and test methods

Part 2: Strength training equipment, additional specific safety requirements and test methods

Part 4: Strength training benches, additional specific safety requirements and test methods

Part 5: Pedal crank training equipment, additional specific safety requirements and test methods

Part 6: Tread mills, additional specific safety requirements and test methods

Part 7: Rowing machines, additional specific safety requirements and test methods

Part 8: Steppers, stairclimbers and climbers, additional specific safety requirements and test methods

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This part of EN 957 concerns the safety of rowing machines.

It amends and supplements EN 957-1. The requirements of this specific standard take priority over those in the general standard.

1 Scope

This part of EN 957 specifies safety requirements for rowing machines in addition to the general safety requirements of EN 957-1 and should be read in conjunction with it.

This part of EN 957 is applicable to stationary training equipment type rowing machines (type 7), hereinafter referred to as rowing machines, within the classes S and H and class A regarding accuracy.

If accessories are provided with the rowing machine for the performance of additional exercises these are subject to the requirements of EN 957-1 and any other specific requirements of the appropriate part of this standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 71-1, *Safety of toys — Mechanical and physical properties.*

EN 547-3, *Safety of machinery — Human body measurements — Part 3: Anthropometric data.*

EN 957-1:1996, *Stationary training equipment — Part 1: General safety requirements and test methods.*

3 Definitions

For the purposes of this standard the definitions of EN 957-1 and the following apply:

rowing machine
stationary training equipment with a moving seat simulating a motion like rowing (see figures 1 to 3).

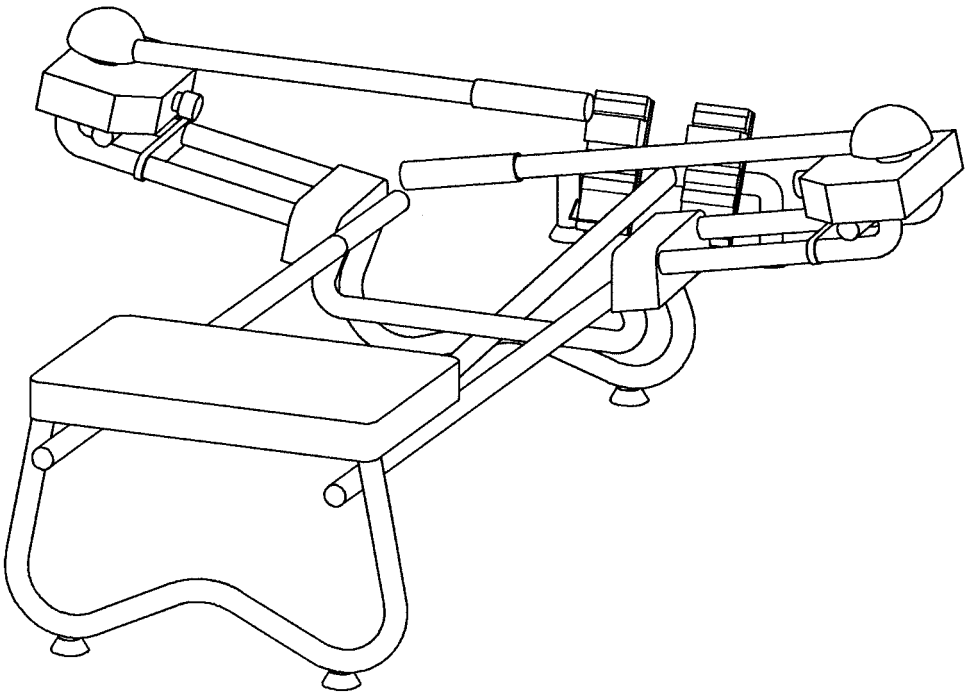
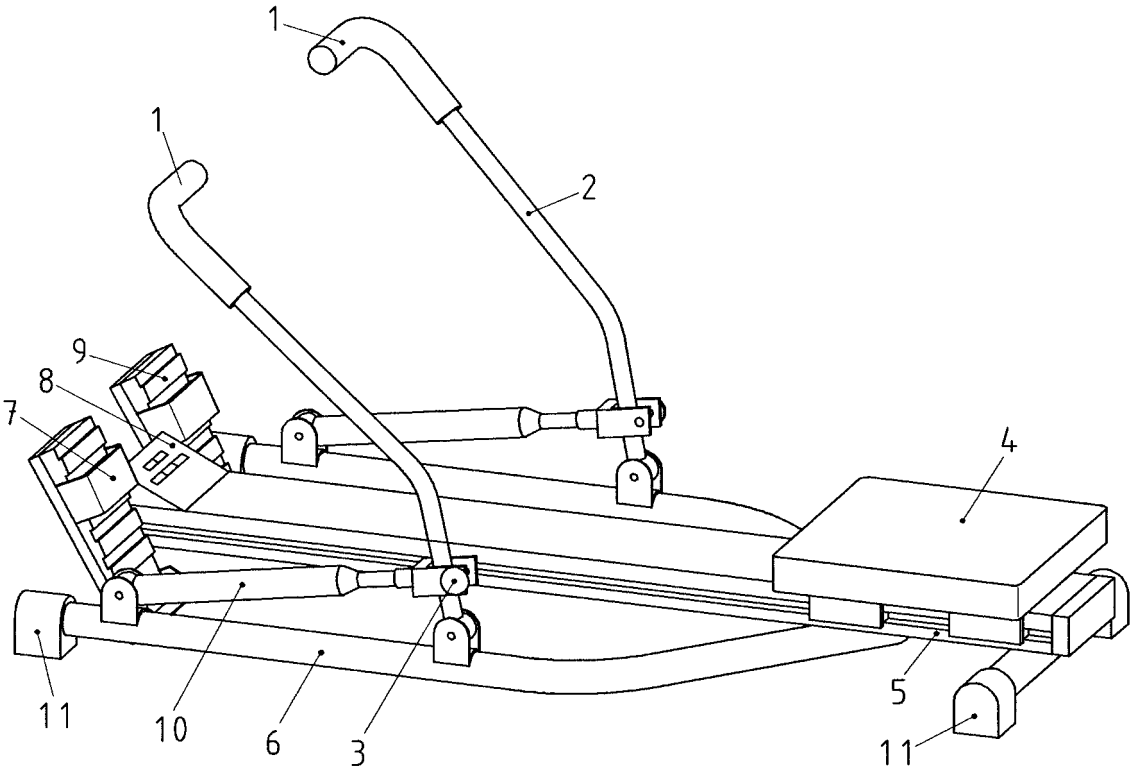


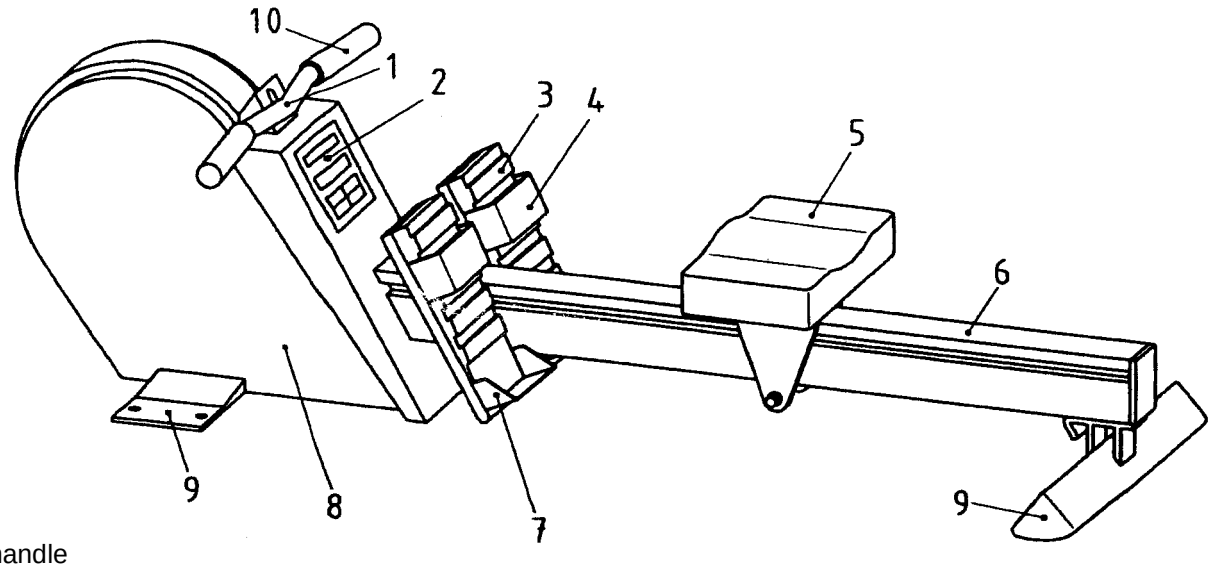
Figure 1 — Example of a rowing machine with sculling system



Key

1 hand grip
2 rower arm
3 tension adjustment
4 seat
5 rail
6 frame
7 foot-strap
8 display
9 foot support
10 hydraulic/pneumatic piston
11 base support

Figure 2 — Example of a rowing machine with hydraulic/pneumatic system



Key

1 handle
2 display
3 foot support
4 foot-strap
5 seat
6 rail
7 heel bar
8 housing
9 base support
10 hand grip

Figure 3 — Example of a rowing machine with cable system

4 Classification

Clause 4 of EN 957-1:1996 applies.

5 Safety requirements

5.1 General

Depending on the design of the piece of equipment the following requirements shall apply as appropriate.

5.2 External construction

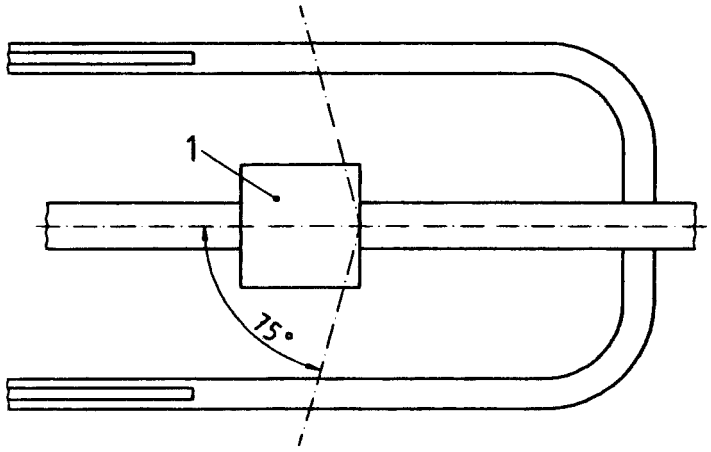
5.2.1 Squeeze, shear and reciprocating points within the accessible area

The distance between movable parts and adjacent movable or rigid parts shall be at least 25 mm if relevant for fingers, otherwise it shall be at least 60 mm.

Required stops are excluded (if the user is not put at risk). Accessible stops shall each have a minimum surface of 400 mm^2. Stops which compress shall each produce a surface of 400 mm^2 when compressed with a pressure of 90 N/cm^2.

The 60 mm does not apply when the squeeze points remain within the user's field of vision over the full range of movement during use (see figure 4).

If the distance between movable parts and adjacent rigid parts does not change during the movement, the test fingers of 6.2 shall not become trapped.



Key
1 seat

Figure 4 — Field of vision

5.2.2 Transmission elements and rotating parts

Transmission elements, fans and flywheels shall be protected, so that, when tested in accordance with 6.2, the test finger cannot be trapped.

5.2.3 Temperature rise

When tested according to 6.4, accessible parts of the rowing machine shall not have a temperature greater than 65 °C.

5.2.4 Seats

When tested in accordance with 6.3 and 6.1.4, the seat shall not derail.

5.3 Intrinsic loading

When tested according to 6.5

— with 250 kg for class H and

— with 300 kg for class S

each piece of equipment shall withstand the test force without being deformed for more than f = 1/100 for a simply supported beam and f = 1/150 for a cantilever beam (see figure 5).

After the test all parts of the equipment shall function according to the manufacturer's instructions for use.

The seat wheels or rollers should not have excessive play and shall rotate freely.

5.4 Handles

In rowing machines where the handle is connected to the machine by a flexible member (rope belts or chains) the mass of the handle without a flexible member shall not exceed 600 g.

Test according to 6.1.5.

EN 957-7:1998 (E)

5.5 Foot supports and foot straps

For classes S and H provisions shall be made for fastening the foot (foot straps), for class S the foot support or foot strap shall be adjustable for different foot sizes. Test according to 6.1.4.

When tested in accordance with 6.1, each foot strap shall withstand in

— class H: 500 N

— class S: 1 000 N

without breakage.

When tested in accordance with 6.6.2, each foot support shall withstand a load test with 1 000 N without breakage.

5.6 Endurance test

When tested in accordance with 6.7, the rowing machine shall withstand

— 12 000 cycles for class H and

— 100 000 cycles for class S.

After the test the rowing machine shall be capable to functioning according to the manufacturer's instructions for use on the correct use and shall not show any signs of damage, e. g. oil leakage.

5.7 Stability

When tested according to 6.8, the base of the rowing machine shall not lift for more than 10 mm.

5.8 Additional requirement for class A

The variation of the indicated or determined power P from the power input shall not exceed $\pm$ 5 W up to 50 W and $\pm$ 10 % over 50 W.

Testing in accordance with 6.9.

6 Test methods

6.1 General

6.1.1 Dimensional check

6.1.2 Visual examination

6.1.3 Tactile examination

6.1.4 Performance test

6.1.5 Weighing test

6.2 Testing of squeeze, shear and reciprocating points within the accessible area and transmission elements and rotating parts

Apparatus:

— test finger probe B in accordance with EN 71-1 for class H and

— test finger in accordance with 6.5 of EN 957-1:1996 for class S.

Approach the test fingers from all sides to all moving parts.

Determine whether the test finger is trapped.

6.3 Testing of seats

Apply a test force of 100 N for 1 min to all directions of the seat.

Check if the seat always remains attached to the rail.

6.4 Testing of temperature rise

Apparatus: contact thermometer with an accuracy of ± 1 °C.

Operate the rowing machine for 20 min with the following values:

a) for speed-dependent equipment

— 25 complete strokes per min;
— 350 N measured at one or both handles combined;
— 60 % of the whole movement;

b) for speed-dependent equipment

— 350 N over 60 % of the movement at the appropriate stroke rate.

The power of 350 N is the average power produced over 1 complete stroke.

6.5 Testing of intrinsic loading

Place the rowing machine freely on a flat floor and clamp the seat in the middle position of the frame supports.

Apply a test load F of

— 250 kg (class H) and

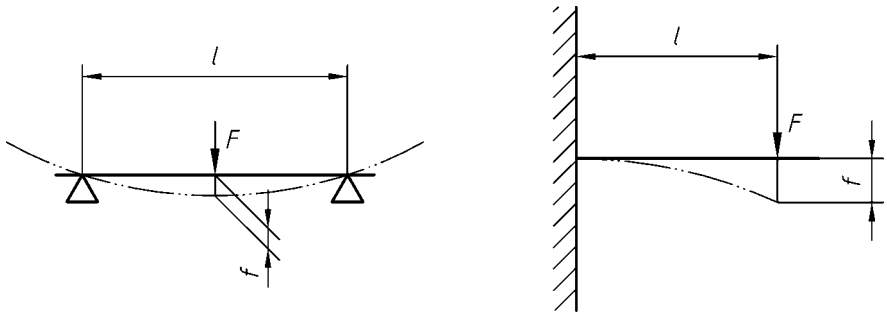
— 300 kg (class S)

to the seat for 5 min, see figure 5.

Remove the load and determine the reference dimensions f according to figure 5.

The feet of the equipment shall not be fixed to the floor during the test.

EN 957-7:1998 (E)



a) simply supported beam b) cantilever beam

Figure 5 — Permanent deformation test

6.6 Testing of foot-supports and foot straps

6.6.1 Apply the test force at the centre of the foot-strap at right angles to the foot supports for 1 min.

6.6.2 Apply the test force of 1 000 N to the foot support by using the test device according to figure 6 for 1 min.

Dimensions in millimeters

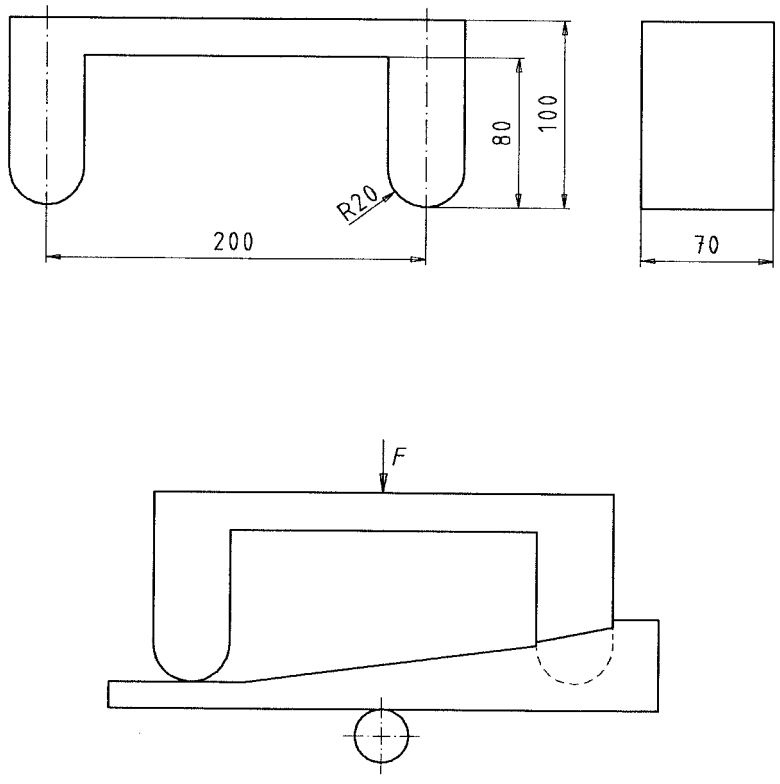


Figure 6 — Test device for testing foot supports

6.7 Endurance testing

For speed-independent machines carry out the test at 25 cycles/min at a force which produces 200 N at the handles and covers 75 % to 80 % of the full stroke range of a 95percentile man in accordance with EN 547-3 with a moving load of 60 kg placed on the seat.

For speed dependent machines carry out the test at a speed which produces a force of 200 N at the handles.

Perform the endurance test as follows:

a) for class H 12 000 cycles working for 15 min and rest time 15 min and continue the same pattern until complete;

b) for class S 100 000 cycles working for 10 h, cool down to room temperature, then continue for further 10 h and continue this method until test is complete.

Check after the test whether the rowing machine is capable for functioning according to the manufacturer's instructions for use on the correct use or if there are any signs of damage.

6.8 Testing of stability

A test person weighing (100 ± 5) kg, height 1750 ± 50) mm shall sit on the rowing machine in a normal exercise position operate the rowing machine as mentioned in the manual

— at 35 strokes/min at minimum resistance for speed-independent machines and

— 35 strokes/min for speed-dependent machines.

Place the rowing machine on a 10° slope in the dynamic direction and on a 5° slope in all other directions.

Duration of test 1 min.

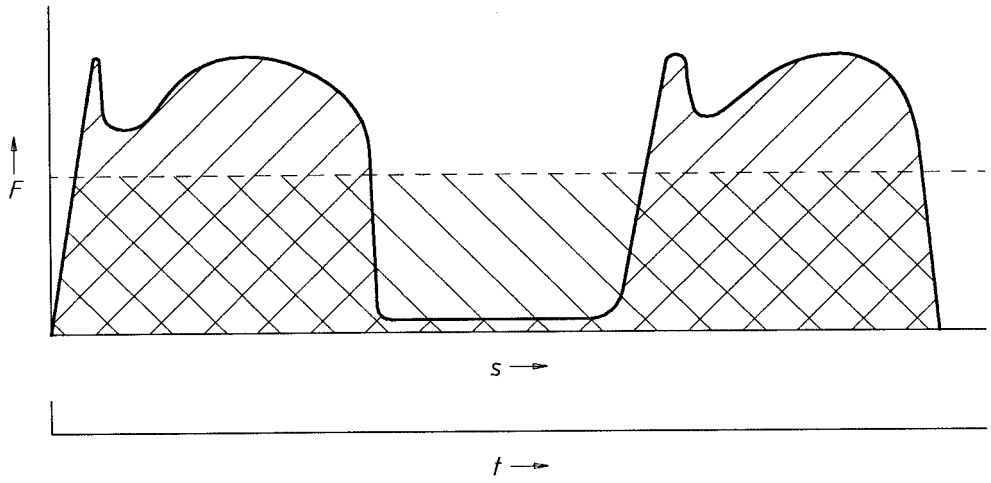
6.9 Test of the additional requirement for class A

Compare the mechanical power input to the power display.

Determine the mechanical power input by calculating the input force over distance and time, see figure 7. The displayed power shall be within ± 10 % of this measured value in watts using the test parameters of the manufacturer, see 7 c).

The power input shall be an average of a 10 min test period.

The test apparatus for measuring force, distance and time shall be accurate to ±1 % for each of the three variables.



Key
1 start of a stroke
2 return
3 start of next stroke

Figure 7 — Example of an input power graph

7 Additional instructions for use

In addition to EN 957-1 easy-to-understand instructions for use shall be supplied with each rowing machine.

The instructions for use shall include information on at least the following points, depending on the class:

a) determination of the load;

b) information on braking system (speed-dependent or speed-independent);

c) for class A the testing parameters: training speed, resistance setting and range of movement;

d) safe handling and storage.

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